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DISCUSSION PAPER NO. 286

The Impact of Inflation on Corporate Taxes and the Cash Flows of Business

by Glenn P. Jenkins

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RÉSUMÉ

L'objet du présent document est d'identifier et de mesurer les effets de l'inflation pour ce qui concerne l'impôt sur le revenu des sociétés et les liquidités mobiles des entreprises. L'auteur y décrit cinq façons par lesquelles l'inflation vient altérer le revenu imposable des sociétés. Il commence par démontrer comment l'utilisation des coûts d'acquisition au lieu des coûts de remplacement des avoirs, dans le calcul de l'amortissement, a pour effet de gonfler le revenu imposable. Ce dernier est également amplifié parce que Revenu Canada exige que soit appliquée la règle du premier entré, premier sorti, pour déterminer les prix dans le calcul du coût des marchandises vendues à même les stocks. Le ministère exige également que soit incluse comme revenu imposable la pleine valeur nominale de l'intérêt accumulé même si, en période d'inflation, une bonne partie de l'intérêt nominal ne représente qu'une compensation pour la baisse de la valeur réelle des avoirs financiers. Le revenu imposable est encore exagéré davantage par suite de l'exclusion des dépenses déductibles de la perte de valeur réelle des soldes de trésorerie. Ces effets sur le revenu imposable sont néanmoins compensés en partie par la pleine déductibilité des frais d'intérêt durant les périodes d'inflation. Lorsque l'inflation augmente, les taux nominaux d'intérêt ont tendance à augmenter d'à peu près autant de points de pourcentage en compensation de la baisse de valeur réelle du capital impayé. Le montant d'intérêt nominal payé peut ainsi augmenter considérablement, même si le coût réel du capital ne change pas de façon appréciable.

Ces cinq effets pris dans leur ensemble ont eu tendance à augmenter de beaucoup le revenu imposable des sociétés au cours des années 70 et au début des années 80. Les résultats de la présente étude, laquelle porte sur toutes les industries non financières au Canada durant la période 1965-1981, montrent que l'inflation a eu un impact considérable sur la somme des impôts payés. L'auteur démontre en outre que cet impact s'est accru à mesure que s'accélérait le taux d'inflation au cours de cette période de 17 ans.

S'il est vrai que l'inflation a contribué à gonfler l'assiette fiscale dans le secteur des sociétés, de son côté, le gouvernement a adopté à plusieurs reprises des mesures destinées à réduire l'impôt de ces dernières; citons, par exemple, la libéralisation des provisions pour amortissement, l'élargissement du crédit d'impôt à l'investissement, une plus grande

disponibilité du financement après impôt, des réductions des taux statutaires d'imposition ainsi qu'une libéralisation des règlements régissant le report des pertes sur les années antérieures et postérieures. Ces mesures n'ont pas pour autant éliminé l'impact de l'inflation sur le régime de l'impôt sur les sociétés; elles n'ont réussi qu'à en soulager les symptômes. Si le taux d'inflation continuait à baisser comme il l'a fait depuis 1981, les effets de l'inflation sur le revenu imposable diminueraient, et les effets du train d'allégements fiscaux généreux et du plus bas taux d'imposition continueraient à se faire sentir. Donc, à moins que soient éliminées un certain nombre de mesures spéciales qui ont été mises en place pour contrer les effets de l'inflation sur le montant des impôts à payer par les sociétés, il faut s'attendre à ce que, suite à une chute du taux d'inflation, les recettes fiscales réelles tirées du régime d'impôt sur le revenu des sociétés diminuent de façon appréciable.

On a calculé qu'en 1981, le revenu imposable avait été gonflé en raison des effets de l'inflation, d'un montant pouvant atteindre 15,1 milliards de dollars. Cette somme équivaut à environ 7,7 milliards de dollars en recettes fiscales, montant qui, à son tour, est à peu très égal à la somme totale des impôts sur le revenu payée par les sociétés non financières cette année-là. Il en découle que deux facteurs sont venus perturber le régime d'impôt sur le revenu des sociétés au cours de cinq dernières années. Premièrement, le taux d'inflation a compté pour beaucoup dans le calcul des sommes d'impôt sur le revenu à payer par les sociétés au cours de cette période. Deuxièmement, le régime d'impôt sur le revenu des sociétés est devenu si généreux que, n'était-ce l'effet de distorsion suscité par l'inflation, le taux effectif d'impôt sur le revenu des sociétés serait maintenant près de zéro, dans la moyenne des cas.

Selon les résultats de l'étude, en excluant l'effet de l'inflation sur la valeur réelle des remboursements de la dette à long terme, les liquidités mobiles des entreprises ont été réduites par l'inflation dans une proportion allant de 12,6 % en 1965 à 29,9 % en 1981. Par contre, si l'on tient compte de la valeur réelle réduite des remboursements de la dette à long terme, la situation est bien différente. En ce cas, l'inflation a réduit la masse des liquidités mobiles de l'ensemble des industries de moins de 10 % pour toutes les années sauf 1974. Au fil des ans, cependant, aucune tendance nette ne peut être observée. Ainsi, nous constatons que les liquidités mobiles ont été réduites par l'inflation de 4,5 % tant en 1965 qu'en 1980.

Bien que les effets à long terme puissent compenser le principal impact qu'exerce l'inflation d'une année à l'autre sur les liquidités mobiles des entreprises, il y a lieu de souligner

qu'à court terme, ces dernières doivent pouvoir continuer à refinancer leurs dettes et à payer des impôts additionnels, sous peine de faire face à la faillite.

L'auteur calcule également les effets tendanciels qu'exerce l'inflation sur les impôts et les liquidités mobiles pour chaque groupe d'industries ainsi que pour les principaux sous-groupes d'industries manufacturières et non manufacturières. Les effets de l'inflation sur les impôts varient considérablement d'une industrie à l'autre, faisant apparaître le caractère hautement discriminatoire de l'inflation. Il en est de même, mais dans une mesure moindre, pour l'effet de l'inflation sur le flux des liquidités mobiles des industries, et cet effet s'accroît encore dans le cas de la dette à long terme.

D'après l'auteur, cette analyse confirme l'hypothèse selon laquelle les taux variables d'inflation, en l'absence d'autres mesures fiscales, sont susceptibles d'accroître le niveau global des impôts que doivent payer les entreprises. Il en découle que, sans compter le caractère discriminatoire de l'inflation pour les divers secteurs industriels et ses effets sur les liquidités mobiles des sociétés, la situation du secteur des entreprises serait sensiblement améliorée si le régime fiscal canadien était réformé de façon à réduire l'impact de l'inflation. Bien que des mesures spéciales peuvent être prises par le gouvernement pour réduire les impôts lorsque le taux d'inflation est élevé, le fait de les laisser inscrites dans la Loi de l'impôt sur le revenu lorsque l'inflation diminue contribue à l'instabilité des recettes publiques provenant de l'impôt sur le revenu des sociétés.

ABSTRACT

The purpose of this paper is to identify and measure the effects of inflation on corporation income taxes and on the net cash flows of business. Five ways in which inflation alters corporate taxable income are identified. The paper begins by showing how the use of historical costs rather than the replacement costs of assets in the calculation of depreciation will cause taxable income to be overstated. Taxable income is also overstated because taxation rules require the use of the first-in first-out pricing rule for measuring the cost of goods sold from inventories. They also require the inclusion in taxable income of the full nominal value of interest earned even though during a period of inflation much of the nominal interest earned is simply compensation for the fall in the real value of financial assets. The exclusion of the loss in the real value of cash balances from deductible expenses causes taxable income to be further overstated. Partially offsetting these effects on taxable income is the provision for the full deduction of interest expense during periods of inflation. When inflation increases, nominal interest rates tend to increase by approximately the same number of percentage points to compensate for the fall in the real value of the principal outstanding. Hence, the amount of nominal interest paid may increase dramatically even though the real cost of funds might not be appreciably changed.

These five effects taken together have tended to increase the taxable income of corporations substantially in the 1970s and early 1980s. The results of this study, which looks at all non-financial industries in Canada for the period 1965-1981, indicate that inflation has had a substantial impact on the amount of taxes paid. This impact was also found to increase as inflation rates rose throughout this 17-year period.

While inflation caused the base for the corporation income tax to be overstated, the government has repeatedly introduced tax measures that reduced corporation taxes such as the liberalization of capital cost allowances, enhancement of the investment tax credit, increases in the availability of after-tax financing, reductions of statutory tax rates and the liberalization of the rules governing the carry back and carry forward of tax losses. However, these policy measures have not eliminated the impact of inflation on the corporate tax system but simply dealt with its symptoms. If the rate of inflation were to fall, as it has since 1981, then the effects of inflation on taxable income would decrease but the effects of

the plethora of generous tax measures and lower tax rates would remain. Hence, it can be expected that unless a number of the ad hoc measures put in place to deal with the symptoms of inflation on corporation tax liabilities are eliminated, actual tax revenues from the corporation income tax system can be expected to fall significantly after the rate of inflation falls.

In 1981 it is estimated that taxable income was overstated because of the effects of inflation by as much as $15.1 billion. This represents about $7.7 billion in tax revenues, and in turn, was approximately equal to the total amount of corporate income taxes paid by the non-financial industries during that year. These results indicate that two things have been happening to the corporation income tax system during the past five years. First, the rate of inflation was a significant determinant of corporate income tax liabilities during this period. Second, the corporation income tax system has been made so generous that were it not for the spurious effects of inflation the effective corporate income tax rate would, on average, be close to zero.

The results of this study for the net cash flow profile of Canadian industries indicate that when the effect of inflation on the real value of long-term debt repayments is excluded, their net cash flow position has been reduced by inflation in amounts ranging from 12.6 per cent in 1965 to 29.9 per cent in 1981. In contrast, however, if one includes the reduced real value of long-term debt repayments, a different picture emerges. In this case, inflation reduced the net cash flows for all industries by less than 10 per cent in all years except 1974. Over time, no clear trend is observable as we find that inflation reduced net cash flows by 4.5 per cent in both 1965 and 1980.

While the long-term effects may offset the major year-to-year inflation induced impacts on the net cash flow, it is nevertheless worth pointing out that in the short-term firms must have the capacity to refinance debt and pay additional taxes if they are to avoid bankruptcy.

This paper also evaluates the pattern of the effects of inflation on corporate taxes and cash flows across individual industry groupings as well as across the major sub-classification of manufacturing and non-manufacturing industries. The effect of inflation on taxes is widely dispersed across industries indicating the highly discriminatory nature of inflation. This dispersion was also found, although to a lesser extent, for the impact on the net cash flow position of industries and increased when long-term debt was considered.

The paper concludes that the analysis supports the hypothesis that variable rates of inflation, in the absence of other tax measures, are likely to increase the overall level of taxation borne by business. This fact, together with the discriminatory nature of inflation across industries and inflation's net cash flow effects, suggests that the business sector would be substantially better off if the Canadian tax system were reformed so that the impact of inflation was reduced. While ad hoc government tax measures can be used to reduce tax liabilities when the rate of inflation is high, their retention in the Income Tax Act when inflation falls adds to the instability of the government's corporation income tax revenues.

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1 INTRODUCTION

There has been considerable debate on the net impact of inflation on the tax liabilities of corporations operating in countries whose corporate income tax systems are not indexed for inflation. While a number of earlier studies seemed to indicate that inflation had the overall result of raising corporation income tax liabilities (Jenkins, 1977; Shoven and Bulow, 1976; Feldstein and Summers, 1979; Myers and Holland, 1984), other studies have tended to emphasize the fact that for the marginal investment the impact of inflation may, on balance, be either positive or negative (Boadway, Bruce and Mintz, 1984).

Because inflation affects the nominal values of physical assets, nominal interest rates, and the real values of other items such as loans and bonds, it has a diverse set of financial implications for the firm. One of the most important effects is caused by the interaction of inflation-induced changes in the real value of variables with the country's corporation income tax system. Major changes can arise in both the magnitude and timing of corporation income tax liabilities.

A better understanding of how inflation alters the flows of tax payments of corporations over time is important for those concerned with tax reform in both developed and developing

countries. In the recent tax reform in Indonesia (1983), the corporate tax system was not designed so as to remove the effects of inflation completely, and recent changes in tax systems in the United Kingdom (1984) have tended to remove some of the measures that were designed to correct for the effect of inflation. On the other hand, the tax reform in Chile (1975) introduced a system that almost totally removed the influence of inflation on the value of corporation income tax liabilities. To date, it has functioned well. Most recently, a number of proposals have been made by the U.S. Treasury (1984) that would make the tax system more neutral to changes in the rate of inflation.

This study attempts to identify the key variables affected by inflation that enter into the calculation of corporate taxes. An estimation is also made of the impact on corporation income tax liabilities in Canada (1965 to 1981) from inflation-induced changes in each of these variables.

The Canadian experience during this 17-year period provides a good laboratory for the observation of the interaction of inflation with a traditional corporation income tax system. During the period 1965-72, inflation rates were very low, ranging from 2.4 to 5.0 per cent. From 1973 to 1976, they rose from 7.0 per cent to 15.0 per cent and then fell to about 7.5 per cent. Finally, during the period from 1977 to 1981, the rate of inflation rose gradually from 7.5 to 10.5 per cent.

In addition to evaluating the impact of inflation on corporation income taxes, an attempt is made to trace out the ways that inflation alters the net cash flow of the firm. However, we exclude the impact that inflation has on the prices of its output and its non-financial inputs. An estimate is made of its overall impact on the net cash flow by industry and is expressed as a ratio of the industry's net cash flow measured before interest expense is deducted but after taxes are paid.

TAX AND FINANCIAL VARIABLES CHANGED BY INFLATION

a) Variables Affecting Taxes

This study does not attempt to identify all of the financial changes caused by inflation irrespective of their significance. Instead, only those changes in financial variables are measured that have an impact on the real value of taxes paid or on the real value of the firm's net cash flow.

In a world where all values were indexed and where proper accounting procedures were employed, the real value of taxes paid should not be affected by the actual rate of inflation experienced. In contrast, under a traditional accounting and tax system, we find that inflation alters the real values of many variables that enter into the calculation of taxes. In addition, the real values of a number of variables that enter into the net cash flow of a firm are changed.

Inflation affects the calculation of corporate income taxes in at least four different ways. First, as the nominal values of fixed assets used in the calculation of depreciation expense are based on their original costs, inflation reduces the real values of depreciation expense allowed as a deduction from taxable income. In order for the corporate income tax system to properly recognize the real amount of depreciation, the undepreciated balance of these assets should be revalued to their net current replacement cost each year. Without this adjustment total expenses will be undervalued and tax liabilities increased.

Second, inflation affects corporate income taxes through the prices used to record the cost of inputs that are placed in inventories and later used in the production of the output. It causes goods purchased and placed in inventories at an earlier date to have their values recorded at prices lower than the same goods purchased later. The question arises as to which price should be used in calculating the cost of goods sold. In terms of the economic cost of the input, it is the cost of replacing the input that is relevant. Hence, the most recent price should be used in calculating the cost of goods sold. In a non-inflationary period, the choice of price is less critical because only changes in the relative price of inputs arise.

Unfortunately, the generally-accepted accounting principles in many countries were designed for an economic environment of very

low rates of inflation. In Canada, the rule for calculating the cost of goods sold for determination of income taxes requires that the cost of inputs be determined using a first-in first-out (FIFO) pricing rule. This means that their cost will always be measured at the purchase prices of the oldest goods in inventory. When production inputs have been held in inventory for a period before being used, the value for cost of goods sold will be below the economic replacement cost of the inputs used. As a result, the operating costs of the firm for the period will be underestimated with taxable income and tax liabilities overstated.

Third, income taxes are affected through the impact inflation has on nominal interest rates and, as a consequence, interest expense.

At any point in time the risk free nominal interest rate, i, is made up of the sum of three components. A real interest rate R, an expected rate of inflation gP^e, and an interaction term made up of the impact of expected inflation on real interest payments, $(R)(gP^e)$. The nominal interest rate can be written as,

$$i = R + gP^e + (R)(gP^e) \qquad (1)$$

It is generally accepted that when an economy experiences a higher rate of inflation borrowers and lenders will come to expect this rate of inflation to occur in the future, and hence nominal interest rates will rise. The part of the nominal interest rate reflecting the expected rate of inflation is a compensation to lenders for the fall in the real value of the principal outstanding.

Looking at the market from the other side, borrowers are willing to pay a higher nominal interest rate because in the future the real value of the principal payments will be reduced relative to the prices of other goods and services. This component of the nominal interest rate should not be included as a business expense for income tax purposes or financial reporting. However, under the corporate income tax laws of most countries it is allowed as a deductible expense. As an outcome of this practice, taxes during a period of inflation are reduced by the increase in interest expense.

The fourth impact of inflation occurs because an increase in the nominal interest rate increases the amount of interest income received when the business holds interest-bearing assets. This increased interest income is, in turn, included in taxable income causing income tax liabilities to increase. To estimate real interest income for tax purposes, the compensation for the expected rate of inflation must be subtracted from the nominal interest income and only the residual included in taxable

income. For the non-financial sectors, we would expect to find that the increased interest expense would be greater than the increased interest income.

The final tax change created by inflation does not come about through the interaction of altered income or expense items flowing through the corporate income tax but is created because inflation imposes a tax on the holding of cash balances.

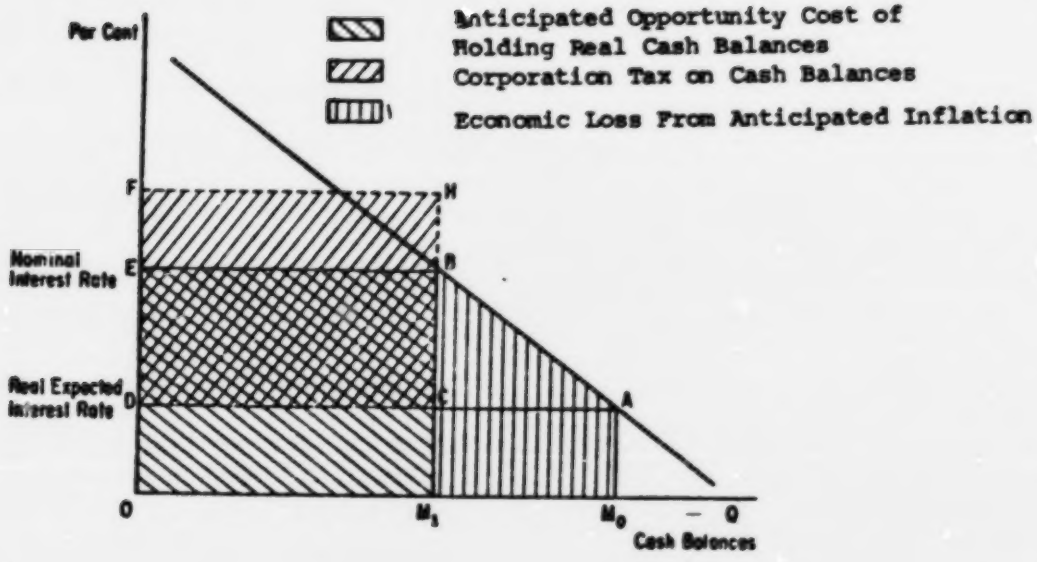
Cash balances are held for the services they provide in reducing the cost of undertaking transactions. Because money has a fixed nominal value, an increase in the rate of inflation will mean that the real value of the stock of money held by individuals or businesses will fall in terms of the quantity of goods and services it can purchase. For the components of the stock of money, including currency and non-interest bearing demand deposits, on which no compensation for inflation is paid (as there is little or no interest rate paid on these items), inflation imposes an additional cost or tax on the holding of these monetary assets.

In an inflationary situation, holders of money will have to add to their stock of nominal cash balances in order to buy and sell the same quantity of goods and services each period. Because the banking system creates these additional cash balances at little cost and sells them in exchange for goods and services, it is the principal collector of this inflationary tax

on cash. The cost of holding cash arising from inflation is illustrated in Figure 1.

FIGURE 1

Demand for Real Cash Balances
and the Inflation tax on Cash Balances



In this figure, the stock of money demanded by a firm is equal to M_1, where the real interest rate is OD and the anticipated rate of inflation is DE. The inflationary cost of holding cash balances is then calculated by multiplying the actual rate of inflation by the stock of real cash balances held, (M_1). If the actual rate of inflation is equal to DF, then the cost of inflation on the holding of money is DFHC.

This cost of inflation, which is a transfer between the holders of cash balances and the banking system, must be distinguished from the economic loss arising from anticipated inflation. The economic loss is represented by the trapezoid with an area of M_1BAM_0 in Figure 1. The welfare cost is created because inflation causes people to reduce their holdings of cash balances. It is not a transfer as is the inflationary tax on cash. The inflationary tax on cash of DFHC has exactly the characteristics of any other tax in that it transfers resources from the holders of the cash to the financial system. On the other hand, the economic loss from inflation arises because the expected cost of holding money is increased, hence, causing people to reduce their holdings of cash balances. This causes an economic resource cost like any other efficiency loss from a market distortion.

b) Variables Affecting the Net Cash Flows of Business

Changes in tax liabilities have an immediate impact on the net cash flow of the firm. In addition, inflation alters a number

of variables that affect the firm's cash flow position. One of the most important is the increase in interest payments due to the response of nominal interest rates to higher rates of inflation. While it is possible for increases in the amount of interest expense to be partially offset by reductions in the amount of principal repaid, we assume here that the increased interest payments reflect a net increase in cash outflows.

For those firms with interest-bearing financial assets, the inflation-induced increase in nominal interest rates will cause them to enjoy an increased cash inflow. This increased cash inflow will, in turn, serve to partially offset the inflation-induced increase in interest expense.

Because inflation causes the real value of the repayment of short-term debt to be reduced, cash outflows will be smaller relative to cash inflow. Short-term debt includes any financial debt instrument that must be repaid within the year. For these liabilities the increased nominal interest expense is partially or totally offset by the fall in the real value of the repayments of the outstanding principal.

Finally, inflation causes the real value of the outstanding long-term debt to fall. As inflation occurs, the real cost of repaying this debt in the future is reduced. The net result is that inflation causes an increase in cash outflow in the current period because of higher nominal interest rates but reduces the

real cash outflow required in the future because the real value of the outstanding principal has been reduced.

When we aggregate the change in income taxes, the tax on cash, the net change in interest payments, and the reduction in the value of short-term debt, we get the net impact of inflation on the industry's current cash flow. In addition, if we add to this sum its impact on the real value of long-term debt, we obtain the value of the aggregate cash flow effects that occur both in the current year and in the future from the current year's inflation.

ESTIMATION OF TAXATION AND CASH FLOW EFFECTS OF INFLATION

a) Change in Depreciation Expense (Capital Cost Allowances)

To measure the impact of inflation on the real value of capital cost allowances, we start with the actual value of capital cost allowance claimed by the firms on their corporate income tax returns. The values of this variable from 1965 to 1981 are presented in Table 1, Col. 1, for total manufacturing, total non-manufacturing (excluding finance), and all non-financial industries combined.[1]

To estimate the value of what the capital cost allowance would have been if it was based on the current replacement cost of the fixed assets, we assume that the present rates of allowable

depreciation for tax purposes would have existed even if the asset values had been adjusted for inflation. The capital cost allowance at current replacement prices can then be estimated by inflating the capital cost allowance claimed by the ratio of the value of the net fixed assets at current replacement prices to their net book values at historical prices.[2]

The estimates of the capital cost allowance at current replacement prices are presented in Table 1, Col. 2, and the ratio of the capital cost allowance at current prices to its value at historical costs are presented in Table 1, Col. 3. This ratio was approximately 1.27 in 1965 for total manufacturing and fell down to a value of 1.18 in 1968. From that point onward, it has been continuously rising, reaching a value of 1.82 in 1981. A similar pattern exists for non-manufacturing, with this ratio rising from 1.20 in 1965 to 1.86 in 1981.

From these estimations, it is quite clear that, if the asset values to which the rates of depreciation are applied had been adjusted for inflation, the amount of capital cost allowance available would have been significantly larger. Of course, there are a number of factors limiting the actual amount of capital cost allowance claimed. For example, the Canadian Income Tax Act allows the firm to refrain from claiming the full capital cost allowance in a year if it is to the firm's advantage. Rather than increase a corporation's tax loss

position and perhaps lose the tax value of the losses because of the restrictions on loss carry forwards, it may choose to claim less capital cost allowance in the current period and more at a later date. As a consequence, if the available capital cost allowance was increased through the indexation of assets, it is conceivable that the full amount would not be claimed. Because we have no way of knowing the degree that these constraints apply, we assume in this study that if the capital cost allowance were adjusted for the changes in the replacement prices of the underlying assets, the increased CCA would be deducted from taxable income.

In order to check to see whether or not the overall capital cost allowance structure in Canada has become more restrictive or generous during this period, estimates of the economic replacement cost of depreciation expense are presented in Col. 4 of Table 1.[3] These values were estimated by applying estimates of the economic rate of depreciation developed by Statistics Canada to the net replacement cost values of the fixed assets. These values are then divided by the values of the actual capital cost allowance claimed for tax purposes (Table 1, Col. 1) to see if the combined effect of inflation and the changes in tax laws over this period have made the capital cost allowance system more or less restrictive. These ratios are presented in Table 1, Col. 5.

For the total of all non-financial industries, the actual capital cost allowance claimed has always been bigger than the economic replacement cost depreciation expense. In 1965, the economic depreciation was approximately 68 per cent of the actual capital cost allowance claimed for tax purposes. This ratio has fluctuated between approximately 64 per cent and 73 per cent until 1975. From 1975 to 1981, it increased until, in 1981, it was approximately 83 per cent. This same general trend appears to hold for the components of the total manufacturing and non-manufacturing.

From this analysis it would appear that the numerous changes in the capital cost allowance rules which took place over this 17-year period have generally liberalized the system. As a result, on the basis of current deductions for CCA, the amounts have been eroded about 21 per cent by inflation. This is significantly less than the 85 per cent undervaluation that has occurred in the net book values of the depreciable assets. From this observation one should not reach the conclusion that the absence of inflation adjustment for capital cost allowances has not created a serious problem. While on an annual basis the acceleration of capital cost allowances has partially compensated the corporations for the erosion in the real value of capital cost allowances, the amount of available CCA in the future will be significantly smaller because the net asset values have not been adjusted to reflect their net replacement

Table 1

Inflation, Capital Cost Allowances and Depreciation Expense
($Millions)

		[1]	[2]	[3]	[4]	[5]
Sector (SIC)	Year	Capital Cost Allowance At Claimed Historical Prices	Capital Cost Allowance At Current Replacement Prices	Ratio [2]/[1]	Economic Replacement Cost Depreciation Expense	Ratio [4]/[1]
Total Manufacturing Industries (101-399)	1965	1648.000	2093.907	1.271	996.498	0.605
	1966	1865.000	2365.398	1.268	1151.045	0.617
	1967	1778.000	2168.451	1.220	1196.438	0.673
	1968	1559.000	1839.496	1.180	1205.161	0.773
	1969	1735.000	2087.025	1.203	1251.095	0.721
	1970	1920.000	2350.894	1.224	1384.775	0.721
	1971	2090.000	2598.761	1.243	1466.317	0.702
	1972	2484.000	3105.816	1.250	1559.309	0.628
	1973	3165.000	4122.389	1.302	1731.325	0.547
	1974	4043.000	5866.998	1.451	2171.139	0.537
	1975	4073.000	6367.431	1.563	2604.326	0.639
	1976	4037.000	6466.012	1.602	2984.196	0.739
	1977	4268.000	6879.508	1.612	3288.161	0.770
	1978	5503.000	8970.928	1.630	3686.148	0.670
	1979	6524.000	11016.276	1.689	4237.914	0.650
	1980	6893.000	12006.591	1.742	5049.630	0.733
	1981	8321.000	15110.919	1.816	6185.131	0.743

Table 1

Inflation, Capital Cost Allowances and Depreciation Expense
($Millions)

		[1]	[2]	[3]	[4]	[5]
Sector (SIC)	Year	Capital Cost Allowance At Claimed Historical Prices	Capital Cost Allowance At Current Replacement Prices	Ratio [2]/[1]	Economic Replacement Cost Depreciation Expense	Ratio [4]/[1]
Total Non-Manufacturing	1965	1428.000	1706.054	1.195	1104.129	0.773
Industries (404-899	1966	1732.000	2112.892	1.220	1220.008	0.704
Excluding 712-793)	1967	1928.000	2368.479	1.228	1326.750	0.688
	1968	2048.000	2493.046	1.217	1437.464	0.702
	1969	2328.800	2900.450	1.245	1619.908	0.696
	1970	2526.600	3227.373	1.277	1911.239	0.756
	1971	2856.300	3754.403	1.314	2131.641	0.746
	1972	2985.500	3974.889	1.331	2408.943	0.807
	1973	3844.400	5291.648	1.376	2767.299	0.720
	1974	4643.300	7014.696	1.511	3464.622	0.746
	1975	5488.700	8907.889	1.623	4138.155	0.754
	1976	5632.200	9223.408	1.638	4694.344	0.833
	1977	6262.600	10314.719	1.647	5378.472	0.859
	1978	7197.900	11947.590	1.660	6168.684	0.857
	1979	9146.500	15594.743	1.705	7207.212	0.788
	1980	10778.600	18805.973	1.745	8367.748	0.776
	1981	11907.300	22197.439	1.864	10575.667	0.888

Table 1

Inflation, Capital Cost Allowances and Depreciation Expense
($Millions)

		[1]	[2]	[3]	[4]	[5]
Sector (SIC)	Year	Capital Cost Allowance At Claimed Historical Prices	Capital Cost Allowance At Current Replacement Prices	Ratio [2]/[1]	Economic Replacement Cost Depreciation Expense	Ratio [4]/[1]
Total All Manufacturing Industries (101-399, 404-899 Excluding 712-793)	1965	3076.000	3738.564	1.215	2100.627	0.683
	1966	3597.000	4436.896	1.233	2371.133	0.659
	1967	3706.000	4543.327	1.226	2523.188	0.681
	1968	3607.000	4352.570	1.207	2642.625	0.733
	1969	4063.800	5012.610	1.233	2871.003	0.706
	1970	4446.600	5613.401	1.262	3296.014	0.741
	1971	4946.300	6402.388	1.294	3597.958	0.727
	1972	5469.500	7158.701	1.309	3968.252	0.726
	1973	7009.400	9507.435	1.356	4498.623	0.642
	1974	8686.300	12984.517	1.495	5635.761	0.649
	1975	9561.700	15368.915	1.607	6742.481	0.705
	1976	9669.200	15745.436	1.628	7678.540	0.794
	1977	10530.600	17250.688	1.638	8666.633	0.823
	1978	12700.900	20988.192	1.652	9854.832	0.766
	1979	15670.500	26655.307	1.701	11445.126	0.730
	1980	17671.600	30820.120	1.744	13417.370	0.759
	1981	20228.300	37459.435	1.852	16760.798	0.829

costs. This effect will continue until these assets are replaced even if the current rate of inflation drops to zero.

In Table 2, Col. 1, the adjustments are shown for the change in taxable income that would occur if the capital cost allowance were calculated on the basis of the net replacement value of the assets rather than on their net book values. For the total of all non-financial industries we find that in 1981 the value of taxable income would be $17.2 billion smaller than it was actually reported if this adjustment had been made. For total manufacturing, the amount of the adjustment would be approximately $6.8 billion, while for non-manufacturing it would have been $10.3 billion.

b) Change in Interest Expense and Interest Income

While the adjustment to taxable income for the correct value of the CCA would reduce taxable income, the adjustment required to measure interest expense properly would tend to increase taxable income. Because it is only the real interest expense that should be deducted for income tax purposes, we need to develop an estimate of the real interest component and add the difference between it and the total nominal interest to taxable income. For these estimations, it is assumed that the real rate of interest facing the industrial sectors in Canada, if there was no inflation, would be approximately 2 per cent per annum. To estimate the amount that the interest expense reported on the

financial statements overstate the real interest expense, we deduct from the total nominal interest expense an amount equal to 2 per cent of the value of interest bearing financial liabilities of the firm. The result represents the component of the nominal interest expense created by the expectation of future inflation. The estimates for this adjustment are presented in Table 2, Col. 2, and should be added back to taxable income.[4]

For the total of non-financial industries, these estimates indicate that in 1965 the interest expense was overstated by approximately $550 million. By 1981, the overstatement of interest expenses was approximately $11.6 billion. For manufacturing, the overstatement of interest expense increased from approximately $200 million to approximately $4.2 billion. Finally, for non-manufacturing, it rose from $355 million in 1965 to approximately $7.4 billion by 1981.

From these estimates we see that the overstatement of interest expense has been a major offset to the understatement of capital cost allowance and has increased rapidly during the 1970s.

Although increases in nominal interest rates raise interest payments by borrowers, they also result in higher interest income to lenders. For those industries which hold financial assets, the premium in the nominal interest rate reflecting compensation for the expected rate of inflation should not be

Table 2

Effect of Inflationary Adjustments on Taxable Income and Taxes
($Millions)

Sector (SIC)	Year	[1] CCA Adjustment	[2] Change in Interest Expense	[3] Change in Interest Income	[4] Inflationary Effect of Inventories in Excess of Inventory Allowance [2]+[3]	[5] Inventory Allowance	[6] Inflationary Tax on Cash Balances	[7] Total Impact on Taxable Income	[8] Impact of Inflation on Taxes	[9] Changes in Taxes as a Proportion of Gross of Tax Profits
Total Manufacturing Industries (101-399)	1965	-445.907	199.888	-62.988	136.900	-209.079	-23.625	-541.711	274.106	0.092
	1966	-500.398	253.652	-65.772	187.880	-328.428	-29.426	-670.372	339.208	0.113
	1967	-390.451	332.930	-70.880	262.050	-312.661	-29.403	-470.465	238.526	0.087
	1968	-280.496	400.962	-91.636	309.326	-262.727	-20.470	-254.366	132.805	0.044
	1969	-352.025	460.244	-104.752	355.492	-382.667	-29.733	-408.932	214.321	0.064
	1970	-430.894	542.754	-128.490	414.264	-430.768	-29.109	-476.506	250.690	0.102
	1971	-508.761	531.546	-93.640	437.906	-306.429	-23.772	-401.056	192.146	0.061
	1972	-621.816	516.622	-118.996	397.626	-510.755	-33.630	-768.575	366.610	0.098
	1973	-957.389	629.304	-141.422	487.882	-1099.409	-67.046	-1635.962	826.161	0.146
	1974	-1823.998	941.228	-232.638	708.590	-2523.808	-108.684	-3747.900	1952.656	0.273
	1975	-2294.431	1137.554	-249.838	887.716	-1935.680	-105.458	-3447.854	1717.031	0.279
	1976	-2429.012	1407.104	-300.380	1106.724	-1848.154	-87.856	-3258.297	1573.758	0.265
	1977	-2611.508	1437.542	-303.678	1133.864	-992.723	-65.995	-2536.362	1235.208	0.205
	1978	-3467.928	1591.866	-410.128	1181.738	-785.566	-73.790	-3145.546	1535.026	0.181
	1979	-4492.276	2119.214	-556.128	1563.086	-2098.646	-120.815	-5148.652	2517.691	0.221
	1980	-5113.591	2990.566	-734.960	2255.606	-2326.677	-128.286	-5312.947	2709.603	0.229
	1981	-6789.919	4229.254	-1224.284	3004.970	-2589.370	-125.318	-6499.636	3334.314	0.290

Table 2

Effect of Inflationary Adjustments on Taxable Income and Taxes
($Millions)

Sector (SIC)	Year	[1] CCA Adjustment	[2] Change in Interest Expense	[3] Change in Interest Income	[4] Inflationary Effect of Inventories in Excess of Inventory Allowance [2]+[3]	[5] Inventory Allowance	[6] Inflationary Tax on Cash Balances	[7] Total Impact on Taxable Income	[8] Impact of Inflation on Taxes	[9] Changes in Taxes as a Proportion of Gross of Tax Profits
Total	1965	-278.054	355.562	-123.690	231.872	-170.126	-36.214	-252.522	127.776	0.069
Non-Manufacturing	1966	-380.892	424.850	-137.570	287.280	-264.380	-58.273	-416.265	210.630	0.092
Industries (404-899	1967	-440.479	484.096	-165.350	318.746	-260.638	-51.623	-433.995	220.035	0.091
Excluding 712-793)	1968	-445.046	573.628	-177.516	396.112	-233.162	-45.356	-327.452	170.963	0.067
	1969	-571.650	702.760	-221.202	481.558	-348.190	-55.596	-493.878	258.841	0.095
	1970	-700.773	957.662	-296.580	661.082	-441.853	-65.392	-546.937	287.743	0.089
	1971	-898.103	969.484	-280.196	689.288	-329.986	-54.006	-592.807	284.014	0.072
	1972	-989.389	973.410	-275.658	697.752	-557.890	-96.325	-945.852	451.171	0.102
	1973	-1447.248	1271.704	-403.216	868.488	-1202.862	-187.532	-1969.155	994.423	0.175
	1974	-2371.396	1813.726	-586.430	1227.296	-2880.492	-354.623	-4379.216	2281.572	0.304
	1975	-3419.189	2272.692	-562.962	1709.730	-2219.185	-301.499	-4230.142	2106.611	0.268
	1976	-3591.208	2677.886	-601.940	2075.946	-2251.623	-292.355	-4059.241	1960.613	0.242
	1977	-4052.119	3001.878	-646.834	2355.044	-1252.861	-235.646	-3185.582	1551.378	0.190
	1978	-4749.690	3366.832	-664.938	2701.894	-993.471	-248.421	-3289.688	1605.368	0.147
	1979	-6448.243	4228.752	-1055.724	3173.028	-2563.697	-415.120	-6254.032	3058.222	0.224
	1980	-8027.373	5783.568	-1547.450	4236.118	-2849.956	-442.637	-7083.849	3612.763	0.236
	1981	-10290.139	7419.200	-2117.898	5301.302	-2993.382	-468.719	-8450.937	4335.331	0.275

Table 2

Effect of Inflationary Adjustments on Taxable Income and Taxes
($Millions)

Sector (SIC)	Year	[1] CCA Adjustment	[2] Change in Interest Expense	[3] Change in Interest Income	[4] Inflationary Effect of Inventories [2]+[3]	[5] Inventories in Excess of Inventory Allowance	[6] Inflationary Tax on Cash Balances	[7] Total Impact on Taxable Income	[8] Impact of Inflation on Taxes	[9] Changes in Taxes as a Proportion of Gross of Tax Profits
Total	1965	-662.564	555.450	-186.678	368.772	-379.205	-59.839	-732.835	370.815	0.076
All Industries	1966	-839.896	678.502	-203.342	475.160	-592.808	-87.699	-1045.244	539.893	0.100
(101-399, 404-899	1967	-837.327	817.026	-236.230	580.796	-573.298	-81.027	-910.856	461.804	0.090
Excluding 712-793)	1968	-745.570	974.590	-269.152	705.438	-495.888	-65.826	-601.846	314.224	0.057
	1969	-948.810	1163.004	-325.954	837.050	-730.856	-85.328	-927.944	486.335	0.080
	1970	-1166.801	1500.416	-425.070	1075.346	-872.622	-94.501	-1058.577	556.917	0.098
	1971	-1456.088	1501.030	-373.836	1127.194	-636.415	-77.777	-1043.086	499.743	0.071
	1972	-1689.201	1490.032	-394.654	1095.378	-1068.645	-129.955	-1792.423	854.986	0.104
	1973	-2498.035	1901.008	-544.638	1356.370	-2302.271	-254.578	-3698.514	1867.750	0.165
	1974	-4298.217	2754.954	-819.068	1935.886	-5404.300	-463.307	-8229.938	4287.798	0.293
	1975	-5807.215	3410.246	-812.800	2597.446	-4154.865	-406.957	-7771.591	3870.252	0.276
	1976	-6076.236	4084.990	-902.320	3182.670	-4099.777	-380.211	-7373.553	3561.426	0.254
	1977	-6720.088	4439.420	-950.512	3488.908	-2245.584	-301.641	-5778.404	2814.083	0.198
	1978	-8287.292	4958.698	-1075.066	3883.632	-1779.037	-322.211	-6504.908	3174.395	0.163
	1979	-10984.807	6347.966	-1611.852	4736.114	-4662.343	-535.935	-11446.972	5597.569	0.223
	1980	-13148.520	8774.134	-2282.410	6491.724	-5176.633	-570.923	-12404.351	6326.219	0.233
	1981	-17231.135	11648.454	-3342.182	8306.272	-5582.752	-594.036	-15101.651	7747.147	0.284

included in taxable income. As in the estimation of the inflationary component of the interest expense, the inflationary component of the interest income is calculated as the difference between the nominal interest income earned and an amount equal to 2 per cent of the value of the firm's interest bearing financial assets.

The estimates of the amount of overstatement of interest income is reported in Table 2, Col. 3.[5] For the total non-financial industries, the overstatement of interest income was equal to approximately to $187 million in 1965. By 1981, this overstatement represented an amount equal to $3.3 billion.

In Table 2, Col. 4, the net effect of the change in interest expense and the change in interest income due to inflation is reported. For all non-financial industries the amount of inflation premium in interest expenses is substantially larger than the inflation premium in interest income. The net amount of overstatement of interest expense rose from approximately $369 million to approximately $8.3 billion between 1965 and 1981. The patterns over time for both total manufacturing and total non-manufacturing are quite similar. For total manufacturing the net overstatement of interest expense rose from $137 million in 1965 to $3.0 billion in 1981, while for total non-manufacturing this overstatement rose from $232 million to about $5.3 billion.

For both manufacturing and non-manufacturing, the net amount of interest expense overstatement is substantially smaller than the understatement of capital cost allowances for every year since 1970.

c) Effect of Inflation on Cost of Goods Sold in Excess of Inventory Allowance

Because the Canadian taxation laws require the cost of goods sold to be calculated using prices on a first-in first-out basis, an adjustment has to be made to reduce the income of the firm for the amount of understatement of the cost of goods sold arising from the use of these accounting rules during a period of inflation.

Since 1977, the Canadian Income Tax Act has partially recognized this consequence of inflation. An amount equal to 3 per cent of the value of inventories held during the year has been allowed as a deduction from taxable income irrespective of the actual rate of inflation. However, the amount of understatement of the cost of goods sold or, conversely, the overstatement of taxable income, is approximately equal to the average amount of inventories held during the period times the rate of inflation experienced. As only the end-of-year values for inventories are available, our estimate of the overstatement of the taxable income from this source is derived by multiplying these end-of-year balances for inventories by the rate of inflation for the year. To recognize the 3 per cent inventory

allowance provided in the Income Tax Act since 1977, for the years from 1977 to 1981, 3 per cent of the end-of-year values for inventories is deducted from this amount.[6]

From Table 2, Col. 5, we find that the understatement of the cost of goods sold has been very substantial during periods of inflation even after the 3 per cent inventory allowance is deducted. For the total of all non-financial industries, this effect of inflation has meant an overstatement of taxable income by approximately $5.6 billion. Of this total, approximately $2.6 billion was in the manufacturing sector while about $3.0 billion was created in the non-manufacturing industries.

d) Inflationary Tax on Cash Balances

Because the real value of cash balances is eroded by inflation, the income tax laws, if they were to recognize all expenses, should allow a deduction for the additional cash that has to be held for the purpose of carrying out transactions. However, this expense is not allowed as a deduction for income tax purposes in most if not all tax jurisdictions.

The adjustment that should be made to reduce taxable income is equal to the stock of cash balances in the sector multiplied by the rate of inflation that has occurred during the year.[7] These values are reported in Table 2, Col. 6.

For the total of all non-financial industries, taxable income was overstated by approximately $60 million in 1965 and in 1981 by about $594 million. For the manufacturing sector, the tax on cash balances has increased from approximately $24 million in 1965 to $125 million in 1981. For non-manufacturing, it increased from $36 million in 1965 to about $469 million in 1981.

TOTAL IMPACT ON TAXABLE INCOME AND TAXES

To determine the overall impact that inflation has on taxes, we need to sum up the various effects. In Table 2, Col. 7, the sum of the adjustment for capital cost allowance, the change in interest expense and interest income, the effect of inflation on the cost of goods sold in excess of the inventory allowance, and the inflationary tax on cash is reported. The overall effect of inflation has been to overestimate the amount of taxable income throughout the entire 17-year period. By 1981, taxable income was overestimated for the non-financial industries by approximately $15.1 billion. For manufacturing, the overestimation of taxable income was approximately $6.5 billion, and for non-manufacturing excluding financial sector, approximately $8.5 billion. Between 1971 and 1981, this inflation-induced overestimation of taxable income has grown approximately fifteen-fold.

The impact of inflation on taxes is derived by multiplying the total impact on taxable income (Table 2, Col. 7) by the statutory tax rate applicable to taxable income in the industry for the particular year in question. The annual change in taxes brought about by the effects of inflation are presented in Table 2, Col. 8.

For the total of all non-financial industries, inflation has resulted in a substantial increase in taxes paid. In 1965, the additional taxes paid because of effects of inflation amounted to approximately $371 million. This amount grew rather slowly over time to approximately $500 million by 1971. From 1971 to 1981 the growth has been rapid, reaching approximately $7.7 billion in 1981. The value in 1981 is approximately equal to the total amount of corporate income taxes paid by these sectors.

In Table 2, Col. 9, the impact of inflation on taxes is expressed as a percentage of the gross of tax profits of the particular sector.[8] For the total of all industries, we find that in 1965 the additional taxes paid because of inflation amounted to approximately 7.6 per cent and hovered around the 10 per cent level until 1973 when it rose to 16.5 per cent. In 1974, the additional taxes paid because of inflation amounted to 29.3 per cent of the gross of tax profits of the total industrial sector. From 1974 to 1978 these additional taxes fell slowly as a percentage of the gross of tax profits

to a rate of 16.3 per cent. From 1978 to 1981 it rose again, reaching 28.4 per cent by 1981.

For the manufacturing sector, the additional taxes paid because of inflation have risen from approximately 9.2 per cent in 1965 to 27.3 per cent in 1974 and 29 per cent in 1981. A similar pattern holds for the non-manufacturing sector where in 1981 the additional taxes paid because of inflation amounted to 27.5 per cent of the gross of tax profits earned by the firm.

These results suggest that the impact of inflation on the taxation of Canadian industry has been severe. While the measured effective rates of taxation expressed as a percentage of the gross of tax profits have been in the 30 per cent range, it would appear that the vast proportion of these taxes in the late 1970s and early 1980s were paid strictly because of the improper accounting for inflation. It follows that if inflation rates fall we would expect to find that corporate tax payments fall significantly, even if the level of economic activity is not reduced.

These results would also call into question the more theoretical analysis which suggests that the impact of inflation may be small. While the effects of inflation may be small, if the inflation is fully expected and the industry has adjusted to these expectations, it does not appear to have had a small impact in Canada during this period.

EFFECT OF INFLATION ADJUSTMENTS ON THE CASH FLOW OF INDUSTRIES

Inflation not only changes tax payments but also has an impact in a number of ways on the cash flow profile of the firms over time. In this section an attempt is made to estimate the impact of inflation on the cash flows of industries.

In bringing these impacts on the cash flow together, we start with the change in income taxes. These changes in taxes are reported in Table 3, Col. 2. The tax on cash is reported in Table 3, Col. 3, as it represents a use of cash and, hence, a cash outflow. The net change in interest payments as estimated previously is reported again in Table 3, Col. 4, as an additional outflow of cash (-) or an inflow (+).

The effect of inflation which reduces the real value of the repayment of short-term debt is reported in Table 3, Col. 5. This is estimated by multiplying the net value of short-term debt and financial assets by the current rate of inflation.[9] The effect that inflation has on the real value of long-term debt and, hence, the cash flow required to repay this debt in the future, is estimated in Table 3, Col. 6.[10] These estimates are obtained by multiplying the value of long-term debt less long-term financial assets by the current rate of inflation.

The sum of the current impact of inflation on the cash flow of the firm (Cols. 2 + 3 + 4 + 5) are reported in Table 3, Col. 7,

and expressed in Col. 8 as a ratio of the net cash flow of the firm measured before interest payments are made but after taxes.

We find that from 1965 to 1981 inflation has caused a progressively greater decrease in the net cash flow position of the firm. In 1965, inflation caused a reduction in the current net cash flow of the firm by approximately 12.6 per cent. By 1974, the reduction in the net cash flow caused by inflation represented 24.5 per cent of the cash flow, and by 1981, the effects reduced the net cash flow by 29.9 per cent. For manufacturing, from 1974 to 1981, the impact of inflation has been to reduce the tax flow of the sectors from between 24 to 34 per cent. In both 1975, 1976 and 1981, the effects of inflation served to reduce the net cash flow of the industries by more than 30 per cent. In the case of the non-manufacturing sectors, the effect has been somewhat less severe, but still caused a reduction in the net cash flow of the non-manufacturing industries of about 27 per cent in 1981.

In contrast, if one takes a longer time horizon in estimating the impact of the inflation on net cash flow and includes the effect that reduces the real value of the repayments of long-term debt, Table 3, Col. 6, the picture changes rather dramatically.

Table 3

Effect of Inflation on Cash Flow
($Millions)

Sector (SIC)	Year	[1] Cash Flow Before Interest And After Taxes	[2] Change in Taxes	[3] Tax on Cash	[4] Net Increase in Interest Payments	[5] Inflationary Transfer on Short Term Debt	[6] Inflationary Transfer on Long Term Debt	[7] Sum of Columns [2], [3] [4], [5]	[8] [7] / [1]	[9] [7]+[6] / [1]
Total All Manufacturing Industries (101-399)	1965	2992.600	-274.106	-23.625	-136.900	2.670	156.897	-431.960	-0.144	-0.092
	1966	3214.600	-339.208	-29.426	-187.880	42.551	288.816	-513.964	-0.160	-0.070
	1967	3249.800	-238.526	-29.403	-262.050	40.429	310.994	-489.550	-0.151	-0.055
	1968	3058.900	-132.805	-20.470	-309.325	20.593	279.721	-442.007	-0.126	-0.046
	1969	3825.400	-214.321	-29.733	-355.492	52.263	370.836	-547.283	-0.143	-0.046
	1970	3482.200	-250.690	-29.109	-414.264	74.323	442.840	-619.740	-0.178	-0.051
	1971	4019.400	-192.146	-23.772	-437.906	56.766	309.527	-597.058	-0.149	-0.072
	1972	4408.400	-366.610	-33.630	-397.626	78.650	522.473	-719.216	-0.163	-0.045
	1973	5958.400	-826.161	-67.046	-487.882	203.404	1069.399	-1177.684	-0.198	-0.018
	1974	7377.600	-1952.656	-108.684	-708.590	662.105	2075.162	-2107.825	-0.286	-0.004
	1975	7124.200	-1717.031	-105.458	-887.716	443.396	1712.799	-2266.809	-0.318	-0.078
	1976	7499.400	-1573.758	-87.856	-1106.724	424.115	1694.215	-2344.222	-0.313	-0.087
	1977	7888.600	-1235.208	-65.995	-113.864	342.342	1337.292	-2092.725	-0.265	-0.096
	1978	10102.500	-1535.026	-73.790	-1181.738	352.874	1298.342	-2437.681	-0.241	-0.113
	1979	12607.000	-2517.691	-120.815	-1563.086	802.294	2375.045	-3399.298	-0.270	-0.081
	1980	14306.700	-2709.603	-128.286	-2255.606	971.361	2833.406	-4122.134	-0.288	-0.090
	1981	15614.700	-3334.314	-125.318	-3004.970	1123.514	3560.500	-5341.087	-0.342	-0.114

Table 3

Effect of Inflation on Cash Flow
($Millions)

Sector (SIC)	Year	[1] Cash Flow Before Interest And After Taxes	[2] Change in Taxes	[3] Tax on Cash	[4] Net Increase in Interest Payments	[5] Inflationary Transfer on Short Term Debt	[6] Inflationary Transfer on Long Term Debt	[7] Sum of Columns [2], [3] [4], [5]	[8] [7] / [1]	[9] [7]+[6] / [1]
Total	1965	2770.300	-127.776	-36.214	-231.872	69.256	312.252	-326.607	-0.118	-0.005
Non-Manufacturing	1966	3257.400	-210.630	58.273	-287.280	82.491	484.263	-473.692	-0.145	0.003
Industries (404-899	1967	3534.300	-220.035	-51.623	-318.746	83.511	480.458	-506.893	-0.143	-0.007
Excluding 712-793)	1968	3766.400	-170.963	-45.356	-396.112	85.859	426.146	-526.573	-0.140	-0.027
	1969	4178.200	-258.841	-55.596	-481.558	137.925	634.048	-658.070	-0.158	-0.006
	1970	5119.400	-287.743	-65.392	-661.082	217.934	808.711	-796.284	-0.156	0.002
	1971	5911.100	-284.014	-54.006	-689.288	167.845	608.729	-859.462	-0.145	-0.042
	1972	6414.200	-451.171	-96.325	-697.752	276.900	1054.593	-968.348	-0.151	0.013
	1973	7817.800	-994.423	-187.532	-868.488	622.391	2224.146	-1428.052	-0.183	0.102
	1974	10032.500	-2281.572	-354.623	-1227.296	1763.587	4201.945	-2099.904	-0.209	0.210
	1975	11499.900	-2106.611	-301.499	-1709.730	1258.009	3438.451	-2859.830	-0.249	0.050
	1976	12726.000	-1960.613	-292.355	-2075.946	1354.234	3226.156	-2974.680	-0.234	0.020
	1977	13791.600	-1551.378	-235.646	-2355.044	1062.814	2676.432	-3079.254	-0.223	-0.029
	1978	16836.600	-1605.368	-248.421	-2701.894	1086.359	2686.541	-3469.323	-0.206	-0.051
	1979	20175.200	-3058.222	-415.120	-3173.028	2109.289	4894.045	-4537.081	-0.225	0.018
	1980	23458.500	-3612.763	-442.637	-4236.118	2516.407	5385.652	-5775.111	-0.246	-0.017
	1981	26150.400	-4335.331	-468.719	-5301.302	3037.336	5579.200	-7068.016	-0.270	-0.057

Table 3

Effect of Inflation on Cash Flow
($Millions)

Sector (SIC)	Year	[1] Cash Flow Before Interest And After Taxes	[2] Change in Taxes	[3] Tax on Cash	[4] Net Increase in Interest Payments	[5] Inflationary Transfer on Short Term Debt	[6] Inflationary Transfer on Long Term Debt	[7] Sum of Columns [2], [3] [4], [5]	[8] [7] / [1]	[9] [7]+[6] / [1]
Total All Industries	1965	5762.900	-370.815	-59.839	-368.772	71.926	468.681	-727.500	-0.126	-0.045
(101-399, 404-899	1966	6472.000	-528.893	-87.699	-475.160	125.042	772.269	-966.711	-0.149	-0.030
Excluding 712-793)	1967	6784.100	-461.804	-81.027	-580.796	123.941	790.533	-999.686	-0.147	-0.031
	1968	7275.300	-314.224	-65.826	-705.438	106.452	704.900	-979.036	-0.135	-0.038
	1969	8003.600	-486.335	-85.328	-837.050	190.188	1003.618	-1218.526	-0.152	-0.027
	1970	8601.600	-556.917	-94.501	-1075.346	292.256	1250.144	-1434.508	-0.167	-0.021
	1971	9930.500	-499.743	-77.777	-1127.194	224.611	917.588	-1480.103	-0.149	-0.057
	1972	10822.600	-854.986	-129.955	-1095.378	355.550	1575.309	1724.769	0.159	-0.014
	1973	13776.200	-1867.750	-254.578	-1356.370	825.796	3289.604	-2652.902	-0.193	0.046
	1974	17410.100	-4287.798	-463.307	-1935.886	2425.691	6268.714	-4261.299	-0.245	0.115
	1975	18624.100	-3870.252	-406.957	-2597.446	1701.405	5150.437	-5173.250	-0.278	-0.001
	1976	20225.400	-3561.426	-380.211	-3182.670	1778.350	4919.598	-5345.958	-0.264	-0.021
	1977	21680.200	-2814.083	-301.641	-3488.908	1405.156	4013.184	-5199.476	-0.240	-0.055
	1978	26939.100	-3174.395	-322.211	-3883.632	1439.233	3901.949	-5941.005	-0.221	-0.076
	1979	32782.200	-5597.569	-535.935	-4736.114	2911.583	7263.284	-7958.036	-0.243	-0.021
	1980	37765.200	-6326.219	-570.923	-6491.724	3487.768	8212.046	-9901.098	-0.262	-0.045
	1981	41765.100	-7747.147	-594.036	-8306.272	4160.850	9139.701	-12486.606	-0.299	-0.080

In Table 3, Col. 9, the ratio of the total of short- and long-term cash flow effects of inflation are expressed as a ratio of the net cash flow of the firm. We find for the total of all non-financial industries that, for all years except 1974, the cash flow effects are less than 10 per cent of the net cash flow in the year. Over time the effects have not altered significantly. In 1965, the combined impact reduced the net cash flow by 4.5 per cent which was exactly what it was also in 1980. In 1981, the total of the long-term and short-term cash flow impacts was equal to 8 per cent of the firm's net cash flow. In manufacturing, the long-term cash impact of a change in inflation is somewhat higher than for all non-financial industries combined, with this ratio rising to 11.4 per cent by 1981. It follows that for the non-manufacturing sector the long-term cash flow impact is somewhat smaller with several years showing a positive impact on net cash flow. In 1981, the long-term cash flow impact as a percentage of the current net cash flow was negative 5.7 per cent.

In summary, these results indicate that inflation can still have a major impact on the year-to-year cash flow position of the firm. Over time, as the debt matures, many of these cash flow impacts are offset. This indicates that during a period of inflation, the financing decisions of firms become much more critical. Inflation disturbs the planned financing pattern requiring new steps to be taken in order to smooth out the fluctuations inflation imposes on the cash flow of the firm.

Unless the firm has the capacity in the short-term to refinance debt or to borrow to pay the additional taxes, it might find itself in serious financial difficulties even if it will benefit in future years from the reduced real cost of debt repayment.

During the last decade of this 17-year period, the rate of inflation was generally accelerating. The impact of inflation during this decade has been clearly to increase the rate of taxation of the corporate sector. This outcome has been partially offset by a number of ad hoc measures, such as increasing the rate of depreciation for machinery and equipment for manufacturing and processing, and the 3 per cent inventory evaluation allowance. However, in spite of these measures, the effect of inflation has been to significantly increase the rate of taxation. The effect of inflation to increase taxes and, in addition, to reduce the net cash flow of industry in the short run, provides substantial evidence that the influence of inflation on business activities in Canada has been far from neutral.

RELATIVE IMPACT OF INFLATION ACROSS INDUSTRIES

To determine if inflation affects all industries in a relatively neutral fashion or whether it has been highly discriminatory, its average impact on taxes is expressed in Table 4, Col. 1, as a ratio of the gross of tax profits for the five-year period from 1977 to 1981. Although the average

Table 4

Average Impact on Income Taxes and Cash Flow of Inflation

1977-1981

Industry	(1) Average Impact on Taxes as Ratio of Gross of Tax Profits	(2) Average Impact on Current Cost Year Cash Flow of Industry as Ratio of Cash Flow Before Interest and After Taxes	(3) Average Impact on Long Term Cash Flow as Ratio of Current Cash Flow Before Interest and Taxes
1. Food and Beverages	.197	-.248	-.075
2. Tobacco Products	.119	-.101	-.066
3. Rubber Products	.212	-.322	-.096
4. Leather Products	.117	-.262	-.129
5. Textile Mills	.244	-.324	-.155
6. Knitting Mills	.160	-.221	-.117
7. Clothing Industries	.055	-.201	-.119
8. Wood Industries	.194	-.211	-.015
9. Furniture Industries	.129	-.242	-.042
10. Total Paper and Allied	.236	-.282	-.066
11. Printing and Publishing	.075	-.180	-.036
12. Primary Metals	.275	-.327	-.122
13. Metal Fabricating	.135	-.235	-.090
14. Machinery Industries	.108	-.255	-.092
15. Transportation Equipment	.488	-.278	-.005
16. Electrical Products	.219	-.239	-.087
17. Non-metal Mineral Products	.190	-.254	-.063
18. Chemicals and Chemical Prod.	.152	-.255	-.034
19. Misc. Manufacturing	.146	-.258	-.092
20. TOTAL MANUFACTURING	.225	-.281	-.099
21. Construction	.145	-.120	.021
22. Transportation	.339	-.335	-.010
23. Storage	.308	-.081	.119
24. Communications	.065	-.229	.095
25. Total Utilities (Private)	.020	-.169	.086
26. Wholesale Trade	.162	-.173	.009
27. Retail Trade	.130	-.098	.021
28. Business Services	.060	-.153	.015
29. Personal and Misc. Services	-.049	-.145	.059
30. TOTAL NON-MANUFACTURING	.214	-.234	-.027
31. TOTAL ALL NON-FINANCIAL INDUSTRIES	.220	-.253	-.055

increase in taxes for the total of all non-financial industries was about 22 percentage points, we find there is a great dispersion of these rates across sectors. The largest tax effects were experienced by the transportation equipment and transportation sectors of 48.8 and 39.9 percentage points, respectively. In contrast, personal and miscellaneous services actually had their taxes reduced by 4.9 per cent over this five-year period. The impact on sectors such as communications, private utilities, printing and publishing, and clothing is relatively small. All experienced less than a 6.5 percentage point increase in taxes because of inflation. This wide dispersion of changes in income taxes indicates the highly discriminatory nature of inflation.

This analysis also identifies a potentially serious structural problem currently in the Canadian Corporate Income Tax System. As inflation accelerated during the 1970s there was a continued effort by the government to relax the provisions dealing with the corporate income tax, such as accelerated CCA investment tax credits and expensing provisions. As a result, the average tax rate did not increase significantly during this period even though inflation was adding a very significant amount of spurious income to the tax base. The question is now, what will happen when inflation is greatly reduced? The conclusion from this analysis is that the Canadian government can expect a dramatic fall in corporation income tax revenues. In order to

offset the loss in tax base due to the reduced rate of inflation, measures will need to be taken to reverse many of the tax preferences given to the corporate sector over the past decade. If such steps were to be taken, it would be highly desirable to also correct the system for the treatment of inflation so that this cycle need not be repeated in the future.

In Table 4, Col. 2, the average impact of inflation on the current year net cash flow of the industry is expressed as a ratio of the cash flow before interest and after taxes. For the total of all non-financial industries, the average impact was to reduce the net cash flow by approximately 25 per cent. While the dispersion of this effect is quite large across industries, it is significantly smaller than on the impact of taxes. The highest impact was on rubber products, textile mills, primary metals, and transportation, where the decrease in net cash flow was in the 32 to 34 percentage point range. On the other extreme, tobacco products, construction, storage, and retail trade experienced a reduction of net cash flow in the 8 to 12 per cent range.

From this evidence, it would appear that inflation has had a rather general impact to reduce the net cash flow available for either reinvestment or the payment of dividends, at least in the early years of an inflationary era.

In Table 4, Col. 3, we add together both the short and long run effects of inflation on the cash flow of the industry and express it as a percentage of the industry's current net cash flow. Averages were taken for the period 1977-1981. We find that the impact is generally below ten percentage points of the net cash flow. The sectors that suffered the greatest loss of cash flow were leather products, textile mills, and primary metals. These sectors all had reductions of cash flows of more than 12 percentage points. On the other hand, several of the non-manufacturing sectors actually had an overall increase in cash flow when both the long- and short-term effects are aggregated.

This evidence suggests that, if inflation exists for a considerable period, the relief the industries get in the repayment of their long-term debt will go most of the way to offsetting the increased cash outflow they suffer in the short run. However, because these cash flow effects occur at different points in time and are highly sensitive to the relative position of the current rate of inflation as compared to its historical rate, inflation will introduce considerably more variability in the net cash flow of the industries over time.

This analysis supports the hypothesis that variable rates of inflation, even if they are not high, are likely to increase the

overall level of taxation borne by business. Not only does the overall level of taxation increase, but the impact is felt in a highly discriminatory way. Inflation makes investment decisions substantially more difficult because of the impact it has on the short-term cash flow of the industry. The evidence from this study would support the notion that the business sector would be substantially better off if the Canadian tax system were reformed so that the impact of inflation was reduced.

Notes

1 Statistics Canada, Corporation Taxation Statistics 1965-81, Ottawa.

2 All of the data used in this study are part of the SOCRAT data base developed by the Tax Policy Branch, Department of Finance, Government of Canada, in conjunction with Econanalysis Incorporated. In this case, the estimates were obtained by multiplying Table 1, Col. 1 by SOCRAT Series 74/SOCRAT Series 78.

3 SOCRAT Series #96.

4 SOCRAT Series #91-0.02 (SOCRAT Series #(20+21+26+29+30+31+32+33) .

5 - SOCRAT Series #(43+44+45) - 0.02(SOCRAT Series #(2+8+13+14+15) .

6 SOCRAT Series 172 less 0.03 of SOCRAT Series #4 for years 1977 to 1981.

7 (SOCRAT Series 1)(SOCRAT Series 84).

8 Gross of tax profits were measured by SOCRAT Series (65+64+63+62).

9 SOCRAT Series (20+21+33) - SOCRAT Series (89-4-1) x SOCRAT Series 84) .

10 SOCRAT Series 37-22-24-38(one-87)-20-21-33-2-8-13-14-15-17) (Socrat Series 84).

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